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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/009,703	03/05/2002	Wolfgang Niehoff	GK-EIS-1045/ 500593.20037	6139

26418 7590 10/22/2004

REED SMITH, LLP
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EXAMINER	
MICHALSKI, JUSTIN I	

ART UNIT	PAPER NUMBER
2644	

DATE MAILED: 10/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/009,703	NIEHOFF ET AL.	
	Examiner	Art Unit	
	Justin Michalski	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *24 June 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *31-91* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *31,32,34,37-44,47,48,51-57,59-61,63-73,75-77,81-83,85, and 87-89* is/are rejected.

7)☒ Claim(s) *33,35,36,45,46,49,50,58,62,74,78-80,86,90 and 91* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, filed 24 June 2004, with respect to the rejection(s)of claim(s) 31 and 60 under 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly found art.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 55 and 75 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 55 recites the limitation "in particular psychoacoustic pre-distortion" within parenthesizes in lines 2 and 3 which is indefinite because it is unclear whether the limitations within the parenthesizes are part of the claimed invention.

Claim 75 recites the limitation "the cavities" in lines 1 and 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 31, 32, 37, 47, 56, and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris (US Patent 5,859,915) (Hereinafter "Norris") in view of Okuno. (US Patent 4,221,930) and further in view of Norris (US Patent 6,229,899) (Hereinafter "Norris '899").

Regarding Claim 31, Norris discloses a method of reproducing audio sound by and ultrasound-producing device comprising the steps of: linking the audio signal to be produced by side band amplitude modulation to a carrier signal in the ultrasonic frequency range (Column 5, lines 9-16). Norris does not disclose the use of dynamic error compensation, frequency characteristic linearization and reducing the amplitude of the carrier signal. Okuno discloses a system which processes frequency modulated carrier waves to compensate when the modulated signal experiences defects (Col. 1, lines 1-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include dynamic error compensation to compensate for signal defects as disclosed by Okuno to produce a higher quality signal.

Norris '899 discloses a method for reproducing sound using an ultrasound device. Norris '899 discloses passing the ultrasonic signal (Figure 12, signal 46) to an ultrasonic transducer (12, 13, 14, or 15) where the amplitude of the ultrasonic carrier signal is reduced resulting in reflected audio sound waves to produce speakers distant from the actual emitter source (Col. 4, lines 53-65). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include

reducing the amplitude of the ultrasonic carrier signal at a transducer in order to emit audio sound waves to a listener from a remote location as disclosed by Norris '899.

Regarding Claim 32, Norris further discloses trigger position 40B where light is engaged but not the speaker (i.e. frequency modulation does not occur during this time and no signal is produced) (Column 4, lines 21-28).

Regarding Claim 64 and 65 it is inherent that the ultrasonic carrier will be attenuated between 8 and 20 dB including 12dB at a position in the material of transducers (12, 13, 14, or 15) by the equation for ultrasonic attenuation $A=A_oe^{-\alpha z}$ where A_o is the amplitude of the propagating wave at some location, amplitude A is the reduced amplitude after the wave has traveled a distance z from that initial location, α is the attenuation coefficient of the wave traveling in the z-direction and e is Napier's constant.

Regarding Claim 37, Norris further discloses a carrier frequency of 50kHz (Column 5, line 16).

Regarding Claim 47, Norris further discloses the transducers (reference 70) arranged in an annular array (Figure 3).

Regarding Claim 56, Norris further discloses a highly directional sound (i.e. only listener can hear) and a target identification with means for confirming accurate engagement with a selected listener (Column 3, lines 1-4) which would allow the user to follow the listener with the light while transmitting sound so only the listener can hear it.

Regarding Claim 59, Norris further discloses the frequency of sonic input (Figure 3, input 58) being changed (i.e. modulated) by modulator 50.

6. Claims 34, 38 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 31 above, and further in view of Selfridge et al. (US Patent 6,606,389).

Regarding Claim 34, Norris as modified discloses a method as stated above apropos of claim 31 but does not disclose double or single side band modulation. Selfridge et al. discloses a sonic emitter with a base frequency and single or double sidebands propagating from the transducer face (Column 9, lines 50-55) so component waves are perfectly collimated. Therefore, it would have been obvious to one or ordinary skill in the art at the time the invention was made that the audio signal could be subjected to single or double side band modulation in have component waves perfectly collimated as taught by Selfridge.

Regarding Claim 38, Selfridge et al. further discloses a sonic emitter where if an input signal includes an upper and lower sideband, a filter component in the modulator may yield a single sideband output (i.e. lower side band may be suppressed) (Column 9, lines 5-8).

Regarding Claim 42, Selfridge et al. further discloses the sonic or subsonic signal may be supplied in either analog or digital form (i.e. would include a digital processor) (Column 9, lines 2-5).

7. Claim 39 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 31 above, and further in view of Ichiyoshi (US Patent

5,699,383). Norris as modified discloses a method as stated above apropos of claim 31 but does not disclose frequency characteristic linearization after modulation. Ichiyoshi discloses a method of linearization (Figure 1) where output after modulator 42 is feedback into a circuit for linearization of the signal out of the amplifier (Column 1, lines 8-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to process a signal after modulation to liberalize a signal through an amplifier for a higher quality output.

8. Claims 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 31 above, and further in view of Norris (US Patent 6,359,990).

Regarding Claim 40, Norris as modified discloses a method as stated above apropos of claim 31 but does not discloses the transducers connected in parallel. Norris ('990) discloses emitters 32 are supported on a stator substrate 33 which is powered in parallel from a driver 36 (Figures 3 and 4; Column 3, lines 61-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the transducers in parallel to provide all transducers with the same sonic output.

Regarding Claim 41, Norris ('990) further discloses Figure 5 which shows the transducers arranged as densely as possible on a plate.

9. Claims 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 31 above, and further in view of Hofer (US Patent 4,949,806).

Regarding Claim 43, Norris as modified discloses a device as stated above apropos of claim 31 but does not discloses a water-air bubble mixture in the sound path. Hofer discloses a headset where vibrations of the transducer are translated to a membrane which pushes the fluid (combination of air and water) toward and away from the ear (Column 3, lines 35-39). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a water-air mixture to help propagate a sound signal from a transducer to the ear.

Regarding Claim 44, Hofer further discloses the device being a headset earpiece (Figure 1).

10. Claims 48 and 54 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 31 above, and further in view of Norris et al. (US Patent 6,108,427).

Regarding Claim 48, Norris as modified discloses a method as stated above apropos of claim 31 but does not disclose separate transducers for the carrier and sideband. Norris et al. ('427) discloses the carrier frequency being transmitted from a separate speaker as sideband frequencies (i.e. carrier and sideband signals are fed to separate transducers) (Column 2, lines 44-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that two separate

transducers could be used to send a carrier frequency and a sideband audio signal to the ear resulting in an audio sound based on the concurrent imposition of the two high frequencies on the tympanic membrane as disclosed by Norris '427.

Regarding Claim 54, Norris et al. ('472) further discloses the carrier frequency and sideband frequency are emitted by separate transducers (Column 2, lines 22, 55).

11. Claims 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 31 above, and further in view of Tanaka et al. (US Patent 4,823,908)

Regarding Claim 51, Norris as modified discloses a device as stated above apropos of claim 31 but does not disclose pivoting the beam into a desired direction. Tanaka et al. discloses (Figure 29) where ultrasonic waves are reflected by adjusting (i.e. pivoting) plate 19 to change listening area from A' to B'. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate means for pivoting ultrasonic beam in order to change the listening area of the audio signal.

Regarding Claim 52, Tanaka et al. further discloses pivotable reflector (Figure 29, plate 29) which reflects the ultrasound into a desired direction (A' or B').

Regarding Claim 53, Tanaka et al. further discloses (Figure 14) which comprises an acoustic filter 20 and reflector 19 (which could be mounted on a wall) to reflect the sound signal from the transmitter 8 to the listener 9.

12. Claim 57 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 31 above, and further in view of Elchinger (US Patent 4,280,204). Norris as modified discloses a method as stated above apropos of claim 31 but does not discloses a distance-measuring device based on ultrasound. Elchinger discloses a mobility cane (Figure 1) that uses a transmitting and receiving transducer for warning (i.e. measuring distance and warning is distance is lower than a set amount) of low-lying objects that might contact the upper extremities of a user (Paragraph bridging columns 1 and 2). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that ultrasound transducers could be used for detecting distance between objects.

13. Claims 60, 61, 64-66, 76, 85, 87, and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris (US Patent 5,859,915) (Hereinafter "Norris") in view of Okuno.

Regarding Claim 60, Norris discloses a method of reproducing audio sound by and ultrasound-producing device comprising the steps of: linking the audio signal to be produced by side band amplitude modulation to a carrier signal in the ultrasonic frequency range (Column 5, lines 9-16) and means for reducing the amplitude of the ultrasonic carrier signal (It is inherent that the ultrasonic sound signal will be attenuated (i.e. reduced) while traveling through space and materials since it is well known that ultrasonic attenuation can be expressed as $A=A_oe^{-\alpha z}$ where A_o is the amplitude of the propagating wave at some location, amplitude A is the reduced amplitude after the

wave has traveled a distance z from that initial location, α is the attenuation coefficient of the wave traveling in the z-direction and e is Napier's constant). Norris does not disclose the use of dynamic error compensation, frequency characteristic linearization and reducing the amplitude of the carrier signal. Okuno discloses a system which processes frequency modulated carrier waves to compensate when the modulated signal experiences defects (Col. 1, lines 1-7). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include dynamic error compensation to compensate for signal defects as disclosed by Okuno to produce a higher quality signal.

Regarding Claim 61, Norris further discloses trigger position 40B where light is engaged but not the speaker (i.e. frequency modulation does not occur during this time and no signal is produced) (Column 4, lines 21-28).

Regarding Claim 64 and 65 it is inherent that the ultrasonic carrier will be attenuated between 8 and 20 dB including 12dB at a distance from the emitter through air or a material by the equation for ultrasonic attenuation $A=A_oe^{-\alpha z}$.

Regarding Claim 66, Norris further discloses a carrier frequency of 50kHz (Column 5, line 16).

Regarding Claim 76, Norris further discloses the transducers (reference 70) arranged in an annular array (Figure 3).

Regarding Claim 85, Norris further discloses a highly directional sound (i.e. only listener can hear) and a target identification with means for confirming accurate

engagement with a selected listener (Column 3, lines 1-4) which would allow the user to follow the listener with the light while transmitting sound so only the listener can hear it.

Regarding Claim 87, Norris further discloses the frequency of sonic input (Figure 3, input 58) being changed (i.e. modulated) by modulator 50.

Regarding Claim 89, Norris further discloses (Figure 2) where listener positioned in direction of transmitter can hear the audio signal. The listener may move in region where the ultrasound is always directed and be able to hear the audio signal.

14. Claims 63, 67 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 60 above, and further in view of Selfridge et al. (US Patent 6,606,389).

Regarding Claim 63, Norris as modified discloses a device as stated above apropos of claim 60 but does not disclose double or single side band modulation. Selfridge et al. discloses a sonic emitter with a base frequency and single or double sidebands propagating from the transducer face (Column 9, lines 50-52). Therefore, it would have been obvious to one or ordinary skill in the art at the time the invention was made that the audio signal could be subjected to single or double side band modulation in have component waves perfectly collimated as taught by Selfridge.

Regarding Claim 67, Selfridge et al. discloses a sonic emitter where if an input signal includes an upper and lower sideband, a filter component in the modulator may yield a single sideband output (i.e. lower side band may be suppressed) (Column 9, lines 5-8).

Regarding Claim 71, Selfridge et al. further discloses the sonic or subsonic signal may be supplied in either analog or digital form (i.e. would include a digital processor) (Column 9, lines 2-5).

15. Claim 68 is rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 60 above, and further in view of Ichiyoshi (US Patent 5,699,383). Norris as modified discloses a method as stated above apropos of claim 60 but does not disclose frequency characteristic linearization after modulation. Ichiyoshi discloses a method of linearization (Figure 1) where output after modulator 42 is feedback into a circuit for linearization of the signal out of the amplifier (Column 1, lines 8-10). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to process a signal after modulation to liberalize a signal through an amplifier for a higher quality output.

16. Claim 69 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 60 above, and further in view of Norris (US Patent 6,359,990).

Regarding Claim 69, Norris as modified discloses an apparatus as stated above apropos of claim 60 but does not discloses the transducers connected in parallel. Norris ('990) discloses emitters 32 are supported on a stator substrate 33 which is powered in parallel from a driver 36 (Figures 3 and 4; Column 3, lines 61-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the

invention was made to connect the transducers in parallel to provide all transducers with the same sonic output.

Regarding Claim 70, Norris ('990) further discloses Figure 5 which shows the transducers arranged as densely as possible on a plate.

17. Claims 72 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 60 above, and further in view of Hofer (US Patent 4,949,806).

Regarding Claim 72, Norris as modified discloses a device as stated above apropos of claim 31 but does not discloses a water-air bubble mixture in the sound path. Hofer discloses a headset where vibrations of the transducer are translated to a membrane which pushes the fluid (combination of air and water) toward and away from the ear (Column 3, lines 35-39). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a water-air mixture to help propagate a sound signal from a transducer to the ear.

Regarding Claim 73, Hofer further discloses the device being a headset earpiece (Figure 1).

18. Claims 77 and 83 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 60 above, and further in view of Norris et al. (US Patent 6,108,427).

Regarding Claim 77, Norris as modified discloses a device as stated above apropos of claim 60 but does not disclose separate transducers for the carrier and sideband. Norris et al. ('427) discloses the carrier frequency being transmitted from a separate speaker as sideband frequencies (i.e. carrier and sideband signals are fed to separate transducers) (Column 2, lines 44-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made that two separate transducers could be used to send a carrier frequency and a sideband audio signal to the ear resulting in an audio sound based on the concurrent imposition of the two high frequencies on the tympanic membrane as disclosed by Norris '427.

Regarding Claim 83, Norris et al. ('472) further discloses the carrier frequency and sideband frequency are emitted by separate transducers (Column 2, lines 22, 55).

19. Claims 81, 82, and 88 are rejected under 35 U.S.C. 103(a) as being unpatentable over Norris as modified as applied to claim 60 above, and further in view of Tanaka et al. (US Patent 4,823,908)

Regarding Claim 81, Norris as modified discloses a device as stated above apropos of claim 60 but does not disclose pivoting the beam into a desired direction. Tanaka et al. discloses (Figure 29) where ultrasonic waves are reflected by adjusting (i.e. pivoting) plate 19 to change listening area from A' to B'. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate means for pivoting ultrasonic beam in order to change the listening area of the audio signal.

Regarding Claim 82, Tanaka et al. further discloses (Figure 14) which comprises an acoustic filter 20 and reflector 19 (which could be mounted on a wall) to reflect the sound signal from the transmitter 8 to the listener 9.

Regarding Claim 88, Tanaka et al. further discloses (Figure 16) which reflects sound signal from transmitter 8 to listener 9 by way of acoustic filter 20 and reflector 19 with projector 22 emitting a picture on the area for a visual exhibition.

Allowable Subject Matter

20. Claims 33,35,36,45,46,49,50,58,90,62,74,78-80,86,90, and 91 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Justin Michalski whose telephone number is (703)305-5598. The examiner can normally be reached on 8 Hours, 5 day/week.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bill Isen can be reached on (703)305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JIM

XU MEI
PRIMARY EXAMINER